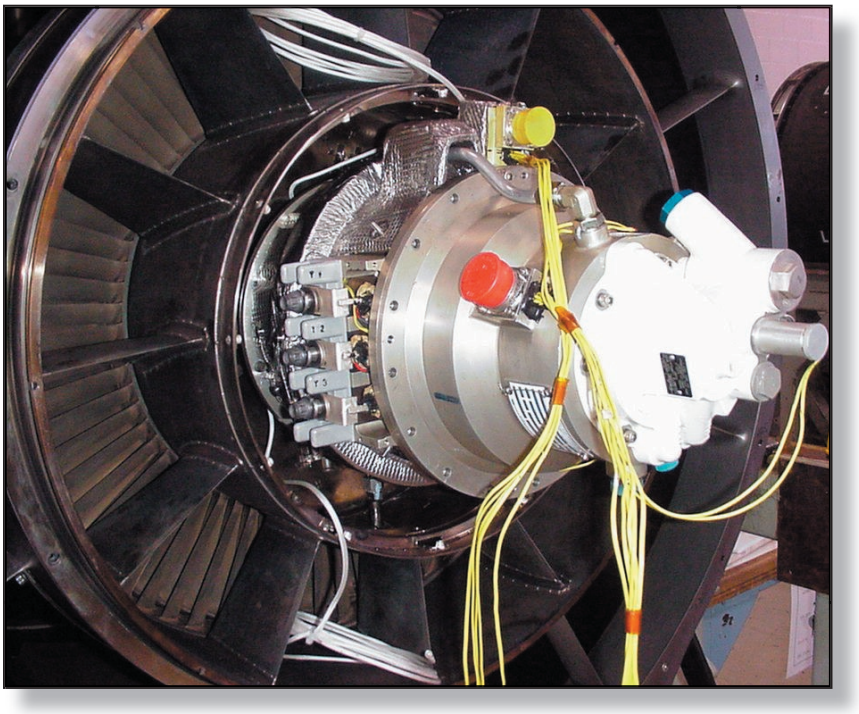
Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Air Force SBIR/STTR

Success Story

RE-MOUNT OF GLOBAL HAWK GENERATOR



A joint effort by the Propulsion Directorate's Power Division (PRP) and the Turbine Engine Division (PRT) resulted in the successful development of a Global Hawk AE3007H engine modification to permit direct-drive generator installation on the rear of its low-pressure fan spool shaft, located in the exhaust section. The engine fan spool mounted generator enhances power extraction allowance at higher operating altitudes.

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Accomplishment

The Propulsion Directorate, Allison Advanced Development Company (AADC), and Innovative Power Solutions (IPS) achieved the program goal of demonstrating increased baseline power for electric system loads and for in-flight re-start capability. Initiated as a Small Business Innovation Research (SBIR) topic during 2000, the directorate's Power Generation Branch led the team through the modification development process and system testing.

Background

SBIR contractor IPS built the generator and its control unit and performed first article testing at its facility. This testing focused on generator performance and response to the heat loads expected at the generator mounting location within the engine's exhaust tail cone. A joint PRP and PRT program followed, during which AADC designed the engine modifications necessary to install the generator on the engine spool drive shaft.

Generator heating problems were addressed by incorporating thermal shields and integrating the air-oil cooling to prevent generator overheating. The AADC test series at Rolls-Royce (Allison) included 60 hours of endurance tests, engine acceleration and generator step-load transient response, vibration scan, and generator thermal soakback evaluation with a 90 kilowatt generator overload. Following engine testing, the generator was returned to IPS for post-test analysis.

Space Vehicles
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Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (04-PR-08)